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*External Financing, Export Intensity and Inter-Organizational Collaborations: Evidence from Canadian SMEs**

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Drawing on institutional theory, resource-based perspective and internationalization theory, we propose that the domestic collaborations of small and medium-sized enterprises (SMEs) have a direct positive effect on their export intensity, as well as an indirect effect through enhancing these firms' access to external financing. We test our hypotheses on a sample of 151 Canadian manufacturing SMEs and find partial support for the indirect relationship. Overall, our results suggest that domestic collaborations positively affect SMEs' access to equity financing but not to bank financing. While both equity and bank financing are found to enhance these firms' export intensity, bank financing seems to have a greater impact. The implications of these results are discussed.

Introduction

Small and medium-sized enterprises (SMEs) are considered to be an important economic engine and a major source of job creation in most countries, but are still under-represented in global markets. In Canada, exports by SMEs account for 40 percent of the total value of foreign sales, even though SMEs make up more than 95 percent of the total number of firms and provide two-thirds of all jobs (Industry Canada 2013). Canadian exports and global economic performance have attracted much attention recently, as the country is struggling with its relatively low export levels, especially after the last economic recession (CGA Canada 2013). A European Commission report (European Commission 2010) using a sample of 9,480 small firms in 33 European countries, also confirmed the low percentage of European SMEs involved in international activities.

The literature on the subject highlights a number of export barriers faced by SMEs, including their limited access to financial resources (Benkraiem and Miloudi 2014; Raju and Rajan 2015) and to information about foreign markets (Arteaga-Ortiz and Fernández-Ortiz 2008; Manova 2012). The problem of export financing for SMEs is not new; for example, Bilkey and Tesar (1977) studied Wisconsin manufacturing firms and found that one of the main problems faced by small exporters was the lack of adequate financing. Similar findings were reported in Hollenstein's (2005) study of Swiss SMEs, Ughetto (2008) study of Italian innovative firms, the reports from OECD (2009) and the European Commission (European Commission

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2010) and, more recently, in Riding et al. (2012) for Canada.

Nevertheless, some SME exporters do manage to secure adequate financing and conduct a significant volume of export transactions, even in markets that are not easily accessible. A number of authors maintain that networks established by entrepreneurs and executives facilitate their access to financial resources mainly through the reduction of information asymmetry between them and lenders (Chen et al. 2007; Fatoki and Odeyemi 2010; Le and Nguyen 2009; Partanen et al. 2008). Bartoli, Ferri, and Murro (2014) and Vos et al. (2007) confirm the importance of the length of the relationship between SMEs and their business partners in facilitating information sharing and access to external financing for export and growth activities. In addition, the SME's networking capacity is also a strategic skill that can directly stimulate its internationalization (Maurel 2009), as partners can play an advisory role and share their knowledge about foreign markets with the firm (Agndal and Chetty 2007; Freeman and Cavusgil 2007; Madsen 2007) as well as other resources such as reputation, equipment, and political influence (Oh, Labianca, and Chung 2006). The present article therefore hypothesizes that SMEs collaborations have a direct positive effect on exports, as well as an indirect effect through enhancing the firm's chances to access external financing.

While several studies exist on how foreign collaborations facilitate the firm's internationalization (Haahti et al. 2005; Kaufmann 1995; Souchon and Diamantopoulos 1999; Styles and Amber 1994), only limited research considered the role of domestic collaborations with organizations in the firm's home country (Babakus, Yavas, and Haahti 2006; Boehe 2013), and even fewer evidence exists about the particular role of collaborations with domestic customers, suppliers, and research organizations in facilitating exports by SMEs. It is essential to understand the role of this type of collaborations because domestic partnerships are easier to access and less costly to establish than foreign ones, due to geographic proximity, cultural similarities, and absence of language barriers between local partners (Forsman and Solitander 2003). This aspect is particularly important for SMEs given that they already suffer from limited managerial and financial resources. In addition, collaborations with domestic partners allow the firm to develop skills that can be used in international activities, such as how to customize its products and manufacturing processes to clients' needs, how to closely monitor and increase the efficiency of and its procurement processes, and how to design innovative products and processes. The current article contributes to this line of research by studying the effect of collaborations with domestic partners on exports by SMEs.

Furthermore, SMEs may try to use different financing sources for their international activities such as bank loans, equity, trade credits, and government loans and grants (Industry Canada 2015). Given that external financing is still one of the main barriers to SMEs' internationalization, it is important for policy makers and firms to understand how it can be overcome and whether local collaborations do enhance SMEs' chances to obtain external financing from these different sources. However, existing research considers the effect of collaborations on one financing source at a time (Alexy et al. 2012; Bartoli, Ferri, and Murro 2014; Fatoki and Odeyemi 2010) and only limited evidence exists about the relative impact of SMEs' collaborations on their access to different financing sources (Le and Nguyen 2009). This article contributes to this literature by considering the simultaneous effect of SMEs' collaborations on their access to financing by banks and by equity investors such as venture capitalists (VCs). Besides, it also studies the influence of these two sources of external financing on SME exports. Given the limited research on this topic, we still know little about the relative effects of debt and equity financing on SMEs' exports, particularly in the Canadian context.

The present study participates to fulfilling these important research gaps by specifically answering the following question: *What is the relationship between domestic collaborations, external financing by banks and equity investors, and export intensity in Canadian SMEs?* To do so, we conduct an empirical analysis of data on 151 manufacturing SMEs in Canada taken from a unique database, and test the direct and indirect relationships between the research constructs.

The remainder of this paper is organized as follows: A literature review of the relationships among collaborations, external financing, and exports is first presented and five research hypotheses are developed. The research methodology is then explained, and the findings are presented. In the last section, we discuss the results and present the research limitations and the conclusions.

Literature Review and Hypotheses Development

Relationship between Collaborations and External Financing

In order to finance their growth activities in general, and internationalization initiatives in particular, SMEs that do not have sufficient internal resources will try to obtain external resources either through debt or equity financing. The literature suggests, however, that banks and external investors are generally unwilling to finance SMEs' export activities due to several reasons, such as the fact that assets which could be used as collateral are often located abroad (Riding et al. 2012); the difficulty of assessing the risks inherent to international activities (Benkraiem and Miloudi 2014); the uncertainty about whether the firm has the necessary competences and management skills to manage its activities abroad, and more generally due to SMEs' informational opacity and to the information asymmetry that characterizes their relationship with investors (Buatsi 2002; De Maeseneire and Claeys 2012; Vos et al. 2007).

Bruns and Fletcher (2008) argue that the unavailability of information required by lenders to assess the SME's plans seems to be one of the most important reasons for credit denial to SMEs by their banks. Similarly, banks may grant loans to untrustworthy firms and incur important subsequent costs, due to their use of incomplete or irrelevant information to assessing and monitoring borrowers (Uchida 2011). Several authors argue therefore that banks need two types of information to assess loans: hard and soft (Berger and Frame 2007; Uchida 2011; Yildirim, Akci, and Halil Eksi 2013). Hard information is related to the firm's past financial performance and ability to pay debts and is easily accessible and verifiable from the SME financial statements and credit history. Soft information, on the other hand, is related to the quality of the SME relationships with its creditors and to its intangible assets and nonfinancial aspects such as the owner's character, the firm's internal controls and capacity of adaptation to new contexts and laws, as well as the flexibility of its production processes (Millar, Udalov, and Millar 2012; Scott 2006). This soft information is not available from the SME financial statements and therefore represents the main cause of information asymmetry between the bank and the potential client (Okten and Osili 2004; Shane and Cable 2002).

In order to reduce information asymmetry and facilitate banks and other investors' access to soft information, many entrepreneurs use networks and inter organizational collaborations as a means to make themselves more known, to build a good reputation, to improve their credibility and to reduce their firm's informational opacity (Le and Nguyen 2009; Slavec and Prodan 2012; Uzzi 1999; Vos et al. 2007). Following several authors (Noseleit and de Faria 2013; Street and Cameron 2007; Thorgren, Wincent, and Boter 2012), collaboration is seen in this article as an intentional and formal cooperative relationship between an SME and one or several business partners, such as clients, suppliers, and research organizations, in order to achieve specific business outcomes such as enhanced efficiency, better response to market needs, and greater competitiveness.

Banks and other investors such as VCs can have access to information about the firm's collaborations at the time of the entrepreneur's interview, before deciding whether or not to invest in the SME, and may contact the SME's business partners such as its clients and suppliers to ask for comments about their experience with the firm (Berger and Udell 2006). Consistent and positive feedback is critical for investors looking to know more about the potential investee. Respected managers of collaborating firms may also provide the potential investors with a reference or an endorsement that helps them in their decision-making. It is therefore assumed that the more a firm collaborates, the more information channels about its past actions and behavior will be available to potential investors, and the easier their assessment of the SME ability to succeed in international activities.

Institutional theory suggests that collaborations contribute to developing two types of organizational legitimacy: cognitive and sociopolitical (Aldrich and Fiol 1994). Cognitive legitimacy refers to the level of public's knowledge about the organization's existence and its practices. It is argued that the more the firm collaborates and builds relationships with other organizations, the more it will be known in the community and its cognitive legitimacy shall increase (Carlos 2014).

Sociopolitical legitimacy refers to the organization's compliance level vis-à-vis recognized and accepted rules and principles. By getting involved into inter organizational collaboration, the firm will necessarily be exposed to some pressure to conform itself with a number of norms. Given that SMEs are more dependent on their collaborators than large firms, they are more likely to adhere to the norms of collaboration (Oliver 1990; Thorgren, Wincent, and Boter 2012). Adherence to group norms enables the company to show to its environment that it is socially competent and that its other behaviors can be trusted (Baron and Markman 2003).

The results of Nguyen, Le, and Freeman (2006) confirm that bankers use their social networks to search information on a potential customer's creditworthiness. Similarly, Alexy et al. (2012) show that VCs use their social capital to identify the most promising investment opportunities. It can be argued that domestic collaborations are particularly important for SMEs interested in making themselves more known, because it is easier and less costly for banks and other investors to ask for referrals from a domestic partner that is known in the local economy and speaks the same language, than from a foreign partner.

In summary, inter-organizational collaborations can be expected to positively influence SMEs' access to external financing by banks and equity capital provided by shareholders other than the owner-manager and his or her family (Ahlstrom and Bruton 2006). Empirically, some studies confirm that SMEs collaborations positively influence their bank financing (Le and Nguyen 2009) and VC financing (Baum and Silverman 2004), however, these researchers did not specifically focus on financing of exporting firms. Our two first hypotheses are:

H1: Collaboration has a positive impact on bank financing.

H2: Collaboration has a positive impact on equity financing by outside investors.

Relationship between External Financing and Export Activities by SMEs

The literature on internationalization suggests that international activities entail non-trivial sunk costs and risks that companies do not encounter when doing business domestically (Kaiser and Kongsted 2008; Melitz 2003; Riding et al. 2012). Internationalization costs include frequent travel expenses, legal services, translation, and adaptation of company documentation (Bartoli, Ferri, and Murro 2014). They also involve costs of customizing products to foreign customers' tastes, costs of information gathering activities, and for entry of the new market (Baldwin and Krugman 1989). Exporters also need to invest in their commercial and marketing activities, increase their manufacturing capacity, maintain higher inventory levels, and be able to manage longer payment periods from foreign clients (Raju and Rajan 2015; Westhead, Wright, and Ucbasaran 2004). Potential exporters must therefore make sure they dispose of enough financial resources to cover these significant costs before going international, which can be particularly challenging for SMEs (Benkraiem and Miloudi 2014; Rutihinda 2008).

The literature recognizes the importance of financial markets in sustaining internationalization and maintains that exports are particularly vulnerable to credit imperfections (Manova 2012; Minetti and Zhu 2011). Hence, firms whose access to external financing is less restricted are in a better position to do business internationally (Crick 2004; De Maeseneire and Claeys 2012; Gorman, Peter, and Faseruk 2005). To our best knowledge, no previous studies tested the relationship between bank financing and exports by SMEs in the Canadian context. There are, however, a few studies conducted in Italy. Their results show that credit rationing negatively influences the probability of exporting in Italian SMEs (Minetti and Zhu 2011), while bank financial support positively affects Italian small firms' chances to enter foreign markets (Bartoli, Ferri, and Murro 2014). This leads to our third hypothesis that expects bank financing to be positively associated with SMEs' export intensity, defined as the proportion of export sales to total sales (Gao et al. 2009). Hence,

H3: Bank financing has a positive impact on SMEs' export intensity.

In this article, we separately examine equity financing provided by investors, other than the owner-manager and his family, as another source of funding that could influence the international development of the company. George, Wiklund, and Zahra (2005) suggest that an owner-manager's attitude toward risk in general and export in particular depends on whether or not he shares the firm's ownership with external investors. If the owner-manager is the sole proprietor, then failure in export activity could jeopardize his career and negatively affect his professional reputation and personal wealth, which is likely to negatively affect his propensity to engage in international activities. Alternatively, the presence of investors other than the owner-manager and his family may reduce the risk attached to exports given the financial support and the advice they provide.

More specifically, the literature suggests that the presence of VCs is likely to positively influence the SME export intensity (Brouthers and Nakos 2005; Loane, Bell, and McNaughton 2007). VC firms not only look for investing in SMEs that are most likely to succeed and assist them financially, but also foresee opportunities to add value to the venture in the post-investment phase (Alexy et al. 2012; Chou, Cheng, and Chien 2013). VCs perform an important governance function for their investees by providing management skills, experience, and expertise (Lockett et al. 2008). They also provide strategic advice and help their investees in identifying the best growth opportunities, including possibilities of exporting their products to international markets. In addition, the VC's social network of professional, experts, and other VCs allows the entrepreneur to access unique resources and valuable information about future opportunities (Ferrary 2010; Hellmann and Puri 2002; Kaplan and Stromberg 2004; St-Pierre, Nomo, and Pilaeva 2011). Empirically, Lockett et al. (2008) show that the VCs' resources positively influence the SME export intensity, particularly for start-ups. Hence, our fourth hypothesis is:

H4: Equity financing by outside investors has a positive impact on SMEs' export intensity.

Relationship between Collaborations and Export Activities by SMEs

The resource-based view (RBV) has been extensively used in the literature to discuss the effect of networks on firms' propensity to export (Hitt et al. 2006; Westhead, Wright, and Ucbasaran 2004). Recent extensions of the RBV introduced the concept of "network resources" and led to the recognition that, in addition to using their internal resources to build competitive advantages, firms tend also to deploy other companies' resources, which they can access through networks (Dyer and Hatch 2006; Kogut 2000; Owen-Smith and Powell 2004). These network resources consist, for example, in information about the partners' own capabilities and how to use them to respond to changing demands in foreign markets. The trust and commitment built among the participants in a given network represent another resource that may help them take higher risks and internationalize their activities (Johanson and Vahlne 2009). Personal referrals to members of other networks that the partner is part of are also network resources that may give access to information about foreign market (Chetty and Campbell-Hunt 2003). As indicated by Johanson and Vahlne (2009, p. 1415): "it is to a large extent via relationships that firms learn and build trust and commitment—the essential elements of the internationalization process." Furthermore, for Lu and Beamish (2001), networks and collaboration allow SMEs to overcome their problems of limited resources, experiences, and credibility.

Empirically, the literature confirms that the SME involvement in inter organizational collaborations has a positive effect on the firm's propensity to export (Amal and Rocha Freitag Filho 2010; Hitt et al. 2006; Mort and Weerawardena 2006; Rodriguez and Nieto 2010) as well as on its export intensity (Boehe 2013; Maurel 2009). Some authors also studied the roles of domestic versus foreign partners in facilitating the firm's success in entering foreign markets and found that both play a major role (Johanson and Mattsson 1988). In addition, Soderqvist and Chetty's (2013) empirical results show that SME collaborations are important for both pre-internationalization activities, such as exploring business ideas and opportunity recognition, and post-internalization activities in terms of resource acquisition and knowledge development about the international market. Hence our last hypothesis is:

H5: Collaboration has a positive impact on SMEs' export intensity.

Other than the main variables considered in this research, the literature suggests some key factors that were found to influence export activities of SMEs. These determinants will be presented in the following section.

General Determinants of Export Activities by SMEs

The literature on internationalization suggests a number of internal and external factors that have an effect on export intensity and performance. In this section, we will focus on two control variables that are particularly relevant in the context of SMEs: firm size and the owner-manager's interest in international business.[1]

Firm Size. In their summary of research into export performance, Sousa, Martinez-López, and Coelho (2008) noted that firm size was the most studied factor. Firm size is considered to be an indicator of available internal resources and access to external resources, including external financing (Antoncic and Hisrich 2000): the larger the firm, the greater its access to resources and skills that will enable it to compete on international markets. Pinho (2007) also identified firm size as a factor in whether the enterprise is able to absorb the costs of its strategy and the risks of international business. According to Karadeniz and Göcer (2007), smaller firms, unlike their larger counterparts, are likely to take the international route gradually or in phases. Like other authors (Bartoli, Ferri, and Murro 2014), we anticipate a positive relationship between firm size and export intensity.

Owner-Manager's Interest in International Business. The literature on exporting SMEs identifies the owner-manager as the key variable in the decision to move onto international markets (Glancey 1998; Westhead, Wright, and Ucbasaran 2002). An owner-manager's interest in exporting appears to be a major determinant of whether or not the firm will engage in foreign business (Amal and Rocha Freitag Filho 2010; Maurel 2009). SMEs' owner-managers who have a strong international orientation tend to be more dynamic in researching information on foreign markets and are more inclined to take part in international trade shows (Okpara 2009), both of which allow them to gather a wealth of information likely to reduce the uncertainty and risks of their international activities. Empirically, Kazem and Van der Heijden (2006) found a positive and significant relationship between an owner-manager's commitment to internationalization and the firm's export performance. We therefore expect a positive link between the owner-manager's interest in international business and SMEs' export intensity.

Figure 1
Research Model

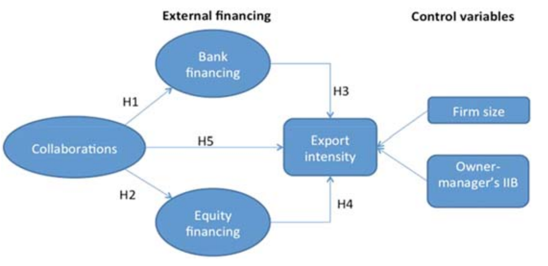


Figure 1 summarizes the research model and hypotheses. It shows that export intensity is expected to be determined by the firm's collaborations and access to external financing through banks and equity. We also expect export intensity to be directly affected by the firm's collaborations. Finally, the firm size and the owner-manager's interest in international activities are used as control variables.

Methodology

Sample and Descriptive Statistics

The data were obtained from PDG®, a private database created by our university research laboratory in the context of a performance diagnostic service offered to manufacturing SMEs from 2000 to 2016. To obtain their diagnosis, firms' owner-managers were asked to complete a 15-page questionnaire and to add their financial statements for the last 5 years. Information collected is voluntarily provided by the participating firms. Therefore, we cannot pretend that our sample represents Canadian manufacturing firms, but only SMEs interested in improving their performance by the usage of a benchmarking performance measurement system. It should, however, be noted that the characteristics of the SMEs included in the database are

[1]The internationalization literature suggests several other factors that may influence export intensity such as the firm's level of innovation, its culture, and its experience with exports (Sousa, Martinez-López, and Coelho 2008). We have included two control variables only, that is the firm size and the owner-manager interest in international activities, for three main reasons: (1) the impact of these two variables on exports in the particular context of SMEs has been demonstrated in past empirical research; (2) these two variables are available from the database we used; and (3) our research objective is not to study the determinants of export intensity but to focus on the effect of collaborations and external financing.

comparable to those of Canadian manufacturing SMEs in terms of industrial sectors represented (low to medium technology intensity) and size for SMEs involved in international activities (around 50 employees) (e.g., Raymond et al. 2015).

Only firms for which we had all the data needed in this research were included in our final sample of 151 SMEs. As shown in Table 1, the sampled SMEs have between 6 and 265 employees, with an average of 53 employees, complying with the Canadian government's definition of SMEs, which refers to businesses with fewer than 500 employees (Industry Canada 2013). The percentage of their sales to non-Canadian markets varies from 0 to 97 percent, with an average of 23 percent, whereas the dollar amount of bank financing per employee varies between \$0 and \$183,333, with an average of \$20,656. Table 1 also shows that 22

Table 1
Descriptive Statistics ($N = 151$)

	Mean	Standard Deviation	Minimum	Maximum
Number of Employees	53.39	47.88	6	265
Export Intensity (Percentage of Sales to Non-Canadian Markets)	0.232	0.286	0	0.970
Bank Financing in Canadian Dollars per Employees (Line of Credit/Number of Employees)	\$20,656	\$26,458	0	\$183,333
Participation of Venture Capital in Financing (yes = 1; no = 0)	0.220	0.415	0	1
Participation of Informal Investors in Financing (yes = 1; no = 0)	0.210	0.410	0	1
Owner-Manager's IIB (Proactive Export = 1; Reactive Export = 0)	0.564	0.420	0	1
Total of Answers About Whether or Not the SME Collaborates with Research Organizations in Production (yes = 1; no = 0); Distribution (1/0); Purchasing and Procurement (1/0); Design and R&D (1/0) and Marketing and Sales (1/0)	0.640	0.926	0	4
Total of Answers About Whether or Not the SME Collaborates with Customers in Production (yes = 1; no = 0); Distribution (1/0); Purchasing and Procurement (1/0); Design and R&D (1/0) and Marketing and Sales (1/0)	1.430	1.369	0	5
Total of Answers About Whether or Not the SME Collaborates with Suppliers in Production (yes = 1; no = 0); Distribution (1/0); Purchasing and Procurement (1/0); Design and R&D (1/0) and Marketing and Sales (1/0)	1.770	1.402	0	5

percent of responding SMEs are financed with a venture capital, while 21 percent are financed with informal investors. The owner-manager's interest in international activities seems to be high in our sample as 56 percent of the respondent indicated that their international activities result from organized and intentional exporting.

The number of areas of collaboration between the sample firms and research organizations (research centers and universities) varies between 0 and 4, with a mean of 0.64. Responses for areas of collaboration with customers and suppliers vary between 0 and 5 with averages of 1.43 and 1.77, respectively. It seems, therefore, that collaborations with suppliers are the most present in our sample, followed by collaborations with customers, then with research organizations. This may be explained by the nature of activities of the sampled SMEs that belong to the manufacturing industry, mostly in the metal, plastic, and rubber processing and the wood sectors, which are considered to be medium-to-low technology (see OECD 2011 for industry classification).

Construct and Variable Measurement

The research variables and constructs were measured as follows:

Export Intensity. Following Calof (1993) and Katsikeas, Leonidou, and Morgan (2000), export intensity is measured as the ratio of SME's sales to non-Canadian markets to their total sales.

Collaborations. Collaborations are measured by the number of areas in which the SME has formal business collaborations with three domestic partners in Canada, namely customers, suppliers, and research organizations. For each of these partners, respondents were asked to indicate whether or not (yes = 1 and no = 0) they collaborated in production, distribution, purchasing and procurement, design and R&D, marketing and sales. For each partner, the manager's responses were added and the total obtained was used as an indicator of the level of collaboration with that partner. Three scores (one for customers, one for suppliers, one for research organizations) were then used as reflective indicators of the construct *collaborations* for each SME (see the Appendix, question 1).

Bank Financing. International activities increase the firm's liquidity needs to finance operations and working capital (Benkraiem and Miloudi 2014), which are usually covered by a bank line of credit. Bank financing was therefore measured with one questionnaire item asking the respondents to specify the dollar amount obtained by the SME through a line of credit with a bank. Given the spread of firm sizes in our sample, the value of the line of credit was divided by the number of employees.

Equity Financing. Equity financing is measured by two reflective items that indicate the participation of shareholders other than the owner-manager and his/her family in capital equity. The respondents indicated whether venture capital firms and informal investors who are not family members held voting shares in the firm's equity (for each of these two investors: yes = 1; no = 0).

Firm Size. Following other authors (Amaia and Felipe 2010; Raymond and St-Pierre 2013), we measured firm size by the number of employees. This variable is a better indicator of available resources, skills, and experience than sales (Maurel 2009).

Owner-Manager's Interest in International Business. The owner-manager's Interest in International Business (IIB) was measured via a multiple choice question that asked the owner-manager whether exports were in response to: (1) unsolicited orders; (2) his/her own irregular initiatives; or (3) his/her own thoughtful and organized initiatives. The variable is rated 1 if the respondent replied (3), and 0 otherwise (see Appendix, question 2). These items represent a more direct measure of the entrepreneur's IIB than the one used by Okpara and Koumbiadis (2010), who asked the entrepreneurs about their information search prior to international activities. Our measure asks instead about the extent to which the export activities result from the entrepreneurs' deliberate efforts and expresses a proactive behavior as opposed to a reactive one to foreign customers' demands (Lado, Martinez-Ros, and Valenzuela 2004).

Variable Correlations and t-Tests

Correlations among the items used to measure the research variables and constructs are presented in Table 2, which shows three

Table 2
Spearman Correlation Matrix

	1	2	3	4	5	6	7	8	9
Firm size	1								
Export Intensity	**0.282*****	1							
	0.00								
Bank Financing	0.110	**0.273*****	1						
	0.178	**0.001**							
Venture Capital Financing	**0.144***	**0.234*****	**0.189****	1					
	0.078	**0.004**	**0.020**						
Informal Investor Financing	0.073	0.073	0.127	**0.275*****	1				
	0.375	0.374	0.120	**0.001**					
Owner-Manager's Interest in International Business	**0.173****	**0.375*****	0.042	0.060	−0.050	1			
	0.034	**0.000**	0.607	0.430	0.543				
Collaboration with Research Organizations	**0.148***	0.123	**0.156***	**0.208****	**0.197****	**-0.181****	1		
	0.070	0.132	**0.056**	**0.010**	**0.015**	**0.027**			
Collaboration with Customers	**0.188****	**0.149***	0.020	0.121	**0.241****	−0.047	**0.212****	1	
	0.020	**0.068**	0.806	0.140	**0.003**	0.563	**0.009**		
Collaboration with Suppliers	0.085	0.013	0.038	0.104	0.132	−0.001	0.127	**0.473*****	1
	0.300	0.877	0.640	0.202	0.106	0.986	0.121	**0.000**	

Statistically significant correlations are in bold.
$^{*}p < .1$
$^{**}p < .05$
$^{***}p < .01$

main results. First, collaboration with research organizations is positively and significantly related to the three types of financing by venture capital, banks, and informal investors, while collaboration with customers is positively associated only to financing through informal investors. Collaboration with suppliers is not linked with any type of financing. SMEs who have collaboration with research organizations seem therefore to have better access to external financing, probably due to their degree of innovation that reduces commercial risk and presents a potential return sought by investors. In addition, collaboration with suppliers may be seen as a substitute to financing by banks and equity, which is consistent with Le and Nguyen (2009). When an SME collaborates with its suppliers, it will have access to commercial credit from them, which decreases its need to seek other sources of financing.

Second, among the three types of collaborations, only collaboration with customers is positively and significantly associated with export intensity. Collaboration with customers is also positively and significantly associated with collaboration with research organizations and collaboration with suppliers.

Third, both bank financing and venture capital financing are positively correlated with export intensity, a result that confirms our expectations. Financing by informal investors other than the owner-manager and his family seems, however, not to influence the sampled SMEs' intensity of exports.

Finally, given the argument in the literature that the presence of a venture capital in SMEs tends to facilitate export activities (Brouthers and Nakos 2005), we performed a t-test to compare firms with a venture capital to those without. The results presented in Table 3 show that

Table 3
Comparison of Firms with Access to Venture Capital to Firms without Access

	No Venture Capital ($N = 118$)	With Venture Capital ($N = 33$)	t-Test Statistic
Firm Size	50.80	62.60	1.25
Owner-Manager's IIB	0.55	0.59	0.65
Export Intensity	0.19	0.37	2.80**
Bank Financing (Line of Credit/Number of Employees)	$17,860	$30,651	1.89*
Participation of Informal Investors in Financing	0.15	0.42	2.91**
Collaboration with Research Organizations	0.52	1.09	2.49*
Collaboration with Customers	1.34	1.76	1.56
Collaboration with Suppliers	1.69	2.03	1.22

*$p < .10$
**$p < .05$

SMEs with a venture capital investor receive more financing from banks and informal investors, have higher export intensity, and collaborate more with research organizations than SMEs without venture capital. Overall, these results confirm the literature suggestions and highlight the importance of venture capital in facilitating SMEs access to financing and to external markets.

Results

We use Partial Least Squares (PLS) with SmartPLS software 3 (Ringle, Wende, and Becker 2015) to test our hypotheses. This method was chosen because of its ability to process latent variables, to analyze models with several dependent variables and to estimate direct and indirect relationships between variables (Chin 1998). According to Chin and Newsted (1999), the use of PLS in research such as ours necessitates a sample of at least 50 observations,[2] a requirement that is amply met by our sample of 151 SMEs.

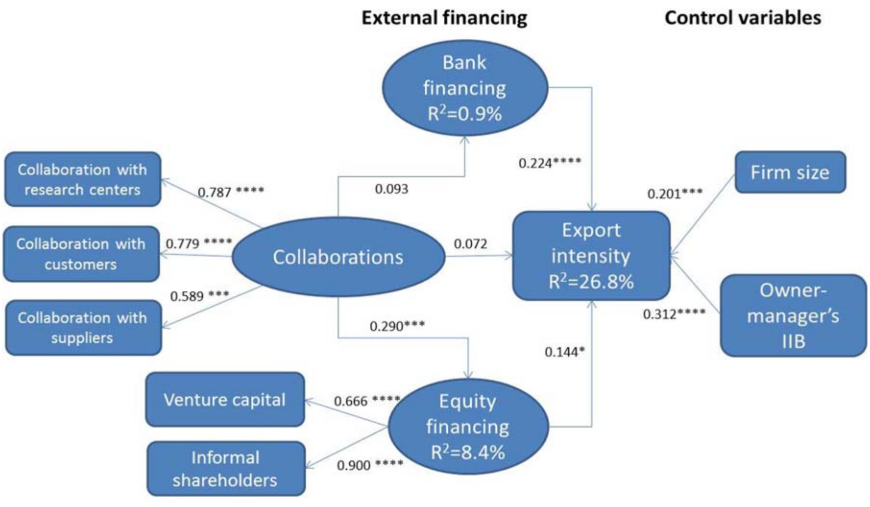
Measurement Model

The PLS method simultaneously evaluates structural paths and the underlying measurement model. Before presenting the structural model results, we need to evaluate construct unidimensionality, reliability, and discriminant validity for the two constructs measured with multiple items, that is, collaborations and equity financing. Unidimensionality is satisfied when indicators' loadings on the construct they are meant to measure are above 0.4 (Johnson and Wichern 1998). As shown in Figure 2, this condition is met for all indicators.

The reliability of constructs measured by several indicators is verified when the value of composite reliability (CR) is above 0.7 (Chin 1998). Discriminant validity is verified when the AVE of each construct is above its squared correlation with each of the other research

[2]Chin and Newsted (1999) recommend using a number of observations that is at least 10 times greater than the highest number of structural links to one of the model's constructs. In this study, the highest number of links is five (see Figure 2).

Figure 2
Test of the Research Model (PLS Results, $N = 151$)



*$p < .1$, **$p < .05$, ***$p < .01$, ****$p < .001$ (one tailed)

constructs, to show that the variance it shares with its own measures is above the variance it shares with other constructs. As shown in Table 4, those two conditions are satisfied for all research constructs.

Structural Model

PLS results reported in Figure 2 show that the general model explains 26.8 percent of the variance in exports intensity, which can be considered as satisfactory[3] (Falk and Miller 1992). Overall, PLS findings provide a partial support to our research model. Collaborations with the three types of partners considered in this study (research organizations, customers, and suppliers) are found to positively and significantly influence the SMEs' access to equity financing ($\beta = 0.290$, $p < .01$), but do not seem to be related to bank financing ($\beta = 0.093$, $p > 0.1$). Hence, H1 is rejected but H2 is supported.

Next, H3 and H4 are also supported because export intensity is positively influenced by both bank financing ($\beta = 0.224$, $p < .001$) and equity financing ($\beta = 0.144$, $p < .1$). Besides, bank financing appears to have a greater effect on export intensity than equity financing.

Finally, our last hypothesis H5 is not supported. The PLS results show a statistically insignificant relation among collaborations and export intensity ($\beta = 0.072$, $p > .1$).

In summary, these results show that collaborations have an indirect effect on export intensity by SMEs through facilitating these firms' access to equity financing.

The results for the control variables are consistent with expectations. Firm size ($\beta = 0.201$, $p < .01$) and owner-manager's interest in international business ($\beta = 0.313$, $p < .001$) have significant positive effects on export intensity, which is consistent with other studies (Sousa, Martinez-López, and Coelho 2008; Tang 2011). In addition, entrepreneur's international orientation, that is, the fact that export activities are planned, seems to be the most important explanatory factor of export intensity among all variables considered in the study. Exporting may therefore be regarded as a long-term strategy for which the firm should develop specific routines and actions that ensure efficient management of the risks encountered on foreign markets.

These results are discussed with more details in the next section.

[3]As a robustness check, we also ran the model using Stata and very similar results were found.

Table 4
Reliability and Discriminant Validity of the Research Constructs

	CR	1	2	3	4	5	6
Bank Financing	1	**1**					
Collaborations	0.76	0.01	**0.52**				
Equity Financing	0.77	0.03	0.08	**0.63**			
Export Intensity	1	0.07	0.02	0.05	**1**		
Firm Size	1	0.00	0.04	0.01	0.08	**1**	
Owner-Manager's IIB	1	0.00	0.02	0.00	0.12	0.03	**1**

CR = composite reliability; Diagonal (in bold) = average variance extracted (AVE).
Sub-diagonal = Shared Variance = (correlations)^2

Discussions, Limitations, and Conclusions

This research studies the direct and indirect relationships between collaborations, access to external financing, and export intensity by manufacturing SMEs in Canada. It is one of the first studies to examine the role of domestic collaborations with customers, suppliers, and research organizations in facilitating SMEs' access to external financing and to international markets. While some limited research exists on the dyadic relationships between collaborations and external financing, collaborations and export, and financing and export, this is one of the first studies to combine these variables in a single model and to consider simultaneously the SME access to bank financing and to equity financing.

Our research model was empirically tested on a sample of 151 Canadian SMEs in the manufacturing sector using a unique proprietary database. Overall, our PLS results do not confirm the existence of a direct association between collaborations and export intensity by SMEs. They show, however, that collaborations indirectly enhance SMEs' export intensity through facilitating their access to equity financing. While collaborations are not found to be associated with a higher access to bank financing by SMEs, this type of external financing seems to have a greater impact on export intensity than equity financing.

First, our findings confirm that SMEs' collaborations do indeed positively influence their access to equity financing by investors such as VCs. Collaborations, measured here by formal business partnerships, appear to result in increased circulation of information between the firm and its partners, which might allow external investors to gather more soft information on SMEs requesting financing (Okten and Osili 2004). Obtaining this type of information through the firm's social capital may reduce information asymmetry between the enterprise and its investors (Shane and Cable 2002), thereby facilitating its access to external financing (Fatoki and Odeyemi 2010; Le and Nguyen 2009). Interestingly, our results show that the influence of collaborations on the firm's access to bank financing is insignificant. This result may be due to the fact that we combined the firm's collaborations with customers, suppliers, and research organizations in one construct, while each of these partners may influence differently the firm's access to financing by banks. For example, Le and Nguyen (2009) found that collaboration with customers and government officials positively influenced the firm's bank financing while its collaborations with suppliers reduced it. The authors explain that good relationships between the SME and its suppliers may give it access to trade credits, which reduces its need to apply for bank loans.

These findings may also suggest that banks do not rely extensively on soft information to make credit decisions and prefer rather to use the *hard* financial data shown in the firm's financial statements, as they may be perceived as more objective and valid. On the other hand, investors in the SME equity may rely more on *soft* information because they share the investee's risks that are not necessarily reflected in their financial statements. Informal investors may also feel more confident about their investment in a given SME that is used to collaborate with other organizations because that lowers their perceived moral hazard and increase their level of trust.

Future studies may further explore the relative effect of collaborations on bank and equity financing by considering separately the firm's collaborations with each partner in terms not only of areas of partnership as we did in this article, but also in terms of strength and length of the relationship. Qualitative research may be particularly useful in studying how banks and investors in SMEs' equity process information about collaborations. Are collaborations seen as complementary to the limited resources possessed by SMEs through allowing these firms to access other companies' resources, or as a mean by which SMEs learn how to share experiences and know-how? It may be argued here that how SMEs are expected to use collaborations may depend on their level of maturity. For example, young and less experienced companies can be expected to deploy collaborations as a means to develop their management capabilities and learn from their partners' experience. Hence, business partners may act as mentors, which complements the advisory role of investors and reassures them.

Our second result shows that both bank and equity financing positively affect the firms' export intensity. While some studies have focused on the link between bank financing and SME exports (Bartoli, Ferri, and Murro 2014), and between equity financing by external investors, particularly by VCs, and exports (Lockett et al. 2008), this article enriches this line of research by considering simultaneously the effect of the two sources of financing on exports. The PLS analyses show that the influence of bank financing on export intensity by SMEs is greater than the influence of equity financing. The important significance of bank financing suggests that if access to this source of external funding were limited, SMEs would reduce their exporting efforts, which may negatively affect the pace of development of these firms' activities and of the economy as a whole. As pointed out by Love and Roper (2015, p. 28), "SMEs that export grow more than twice as fast as those that do not, while internationally active SMEs are three times more likely to introduce products or services that are new to their sector than those which are entirely domestic in orientation." Hence, facilitating exporting SMEs' access to bank financing should be a priority for policy makers (Meyer and Skak 2002).

This result regarding the relative influence of bank and equity financing on exports could be due to the fact that we measure bank financing in a dollar amount, whereas our measure of equity financing is an ordinal scale with three values (0, 1, and 2) based on categorical answers to two questions. Hence, the greater range and variance in the values of the bank financing variable may be responsible for the differences in effect sizes.[4] Future research can further explore this result by developing better measures of the equity financing variable. The length of the relationship between the firm and the bank and between the firm and external investors like VCs may also be taken in account as it can influence the strength of the ties and the relative impact on the firm's exports (Soderqvist and Chetty 2013). It would also be interesting to study VC's motivations to invest in exporting SMEs that collaborate with other firms. For example, do they value collaborations with research organizations that involve Research and Development activities or not? What type of Research and Development activities interest them the most, and under what circumstances are they ready to take the high risk usually related to the launch of innovative products (Love and Roper 2015).

Furthermore, future studies may focus on how the presence of VCs and informal investors in the SME equity may facilitate these firms' access to bank financing. Given that equity investors play an important advisory role, would their presence reduce bankers' perceived uncertainty and motivate them to invest in exporting activities by SMEs? Our t-test results in Table 3 seem to suggest so, but more detailed studies are needed. It would also be interesting to study the effect of collaborations on other sources of export financing used by SMEs, such as trade credit, lease financing, and government loans or grants (Industry Canada 2015).

Third, contrary to the results of Tang (2011), we do not find support to the direct association between collaborations and exports. One explanation may be that Tang (2011) did not directly study the number of areas of collaboration with

[4]We thank the anonymous reviewer who suggested this explanation.

business partners as we did, and examined rather the SME networking behavior in terms, for example, of networking strategy development, participation to networking events, and resource allocation to such activities. Tang (2011) research suggests that collaborations often require the commitment of important resources by the collaborating firms in terms of time and financial costs necessary to put in place adequate governance mechanisms of the inter organizational relationship. It may therefore be argued that too many collaborations may be counterproductive and too costly, particularly for SMEs. Hence, increasing the number of collaborations may not benefit the SME if the firm does not manage them effectively. It is important for these firms to invest in a limited number of close collaborations with a few strategic partners to avoid that their resources and efforts be dispersed. Future research may further investigate the association between collaborations and exports by considering the quality of the SME collaborations not just their number.

Despite the important contributions of this study, it is characterized by a number of limitations that are mainly methodological, and which can be seen as interesting avenues for future research. First, our sample is not random, and therefore provides only a partial picture of the complex links we wish to observe. In order to check the level of generalizability of our results, an interesting avenue for future research would be to replicate this study in other countries and other sectors of activities. Second, given the use of secondary data from a private database, we were not able to take into account the length and strength of the relationships between the SME and its different partners, which may affect the influence of collaborations on access to external financing and on exports. Third, we only measured the presence of VCs and informal investors but did not have information about the importance of their participation in the firm's capital nor about the length of their relationship with the firm. These variables may be important to explore in future studies as they can be indicators of the level of these investors' influence on the SME export decisions and activities. Fourth, as for all cross-sectional studies, it is not possible to explore from our data the dynamic and mutually reinforcing processes that may occur between collaborations and exports. It is also not possible to affirm that there are causal relationships between the variables studied but only that an association exists between them. These limitations do not, however, invalidate our results.

This article offers valuable results for SME managers and governments. Our findings show that financing constraints that hinder SMEs' ability to do business abroad could be partially overcome if these firms develop collaboration relationships with other domestic organizations. While international collaborations facilitate access to foreign markets by reducing uncertainty and providing information about the foreign customers and marketing processes (Babakus, Yavas, and Haahti 2006; Lee, Abosag, and Kwak 2012), domestic collaborators may do so by helping the firm develop competitive products (Eraydin and Armatli-Koroglu 2005) and by sharing information about their own experience with doing business abroad. Finally, domestic collaborations are valuable because they are more easily accessible for SMEs due to the lack of geographic distance and language barriers.

The findings of the present research also suggest that it is important for export-oriented firms to offer adequate training to their managers and employees about how to collaborate properly and effectively with the firm's partners. As pointed out by Tang (2011), collaborations are costly and may even hinder the firm's internationalization efforts. It is therefore particularly important for SMEs to plan and manage well their collaborations and the associated risks. Policy makers should assist SMEs in implementing adequate planning and competence development activities to ensure the success of their collaborations (Industry Canada 2015).

Our results also show the importance of the financial support provided by banks for the success of exports by SMEs. Bank financing was found to be even more important than equity financing by VCs and other external investors. To facilitate SME internationalization, governments, banks, and SMEs should work together to make these firms' access to bank financing easier.

Finally, the literature suggests the existence of a positive relationship between external financing and exports, but does not discuss the specific sources of external financing and their differential effects, nor how they can be accessed by the firm. Our study offers interesting insights to SME managers about the relative impact of bank and equity financing on exports and how collaborations may facilitate access to equity financing.

In summary, the present research findings show how important it is for entrepreneurs who desire to expand their activities in international markets to invest time and resources in collaborations with other domestic business partners such as customers, suppliers, and research organizations. These collaborations may indirectly support the expansion of the SME in international markets through enhancing the firm chances to obtain external funding. Public authorities that are looking for assisting SMEs in their internationalization efforts should not limit themselves to changing policies and increasing the number of free trade agreements only, but should also incite SMEs to network and develop relationships with other local business partners, and to work on building a solid reputation.

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Appendix: Questionnaire Items

Question 1: Collaboration

If the firm currently collaborates with other local organizations in a number of its activities, please indicate the type(s) of partner(s) and the area(s) of collaboration:

Partners fields	Research organization(s)	Supplier(s)	Customers/Client(s)
Production	☐	☐	☐
Distribution	☐	☐	☐
Purchasing	☐	☐	☐
Design/R&D	☐	☐	☐
Marketing/Sales	☐	☐	☐

Question 2: Owner-Manager Interest in International Business (IIB)

If the firm currently sells its products outside of Canada, please specify the following:
Our exports result from. . .

(a) Unsolicited orders (Yes/No)
(b) Our own irregular initiatives (Yes/No)
(c) Our organized and thoughtful initiatives (Yes/No)